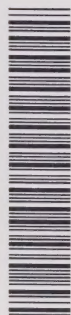


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Division



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CANADA
DEPARTMENT OF MINES AND RESOURCES

HON. T. A. CRERAR, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER

ANNUAL REPORT

OF THE

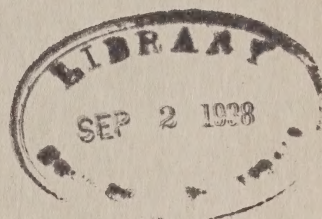
EXPLOSIVES DIVISION

OF THE

BUREAU OF MINES

FOR THE CALENDAR YEAR


1937



CANADA
DEPARTMENT OF MINES AND RESOURCES
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ANNUAL REPORT
OF THE
EXPLOSIVES DIVISION OF THE BUREAU OF MINES
FOR THE CALENDAR YEAR 1937

BY
F. E. Leach

The following report deals with the administration of the Explosives Act during the year ending December 31, 1937.

STAFF

The vacancy in the position of Chief Inspector caused by the transfer of Lieut.-Colonel G. Ogilvie, C.M.G., to the Department of National Defence was filled by the appointment of F. E. Leach who had for some months been carrying out the duties of that position in an acting capacity.

W. P. Campbell, M.Sc., has been appointed Inspector of Explosives for Western Canada with headquarters at Vancouver.

The offices of the Division have been moved to the Bureau of Mines Building, Sussex and George Streets, and the chemical work, which is still being done by the Division of Fuels, is now provided with a specially equipped laboratory on Booth Street.

MANUFACTURE OF EXPLOSIVES

The number of licensed factories engaged in the production of explosives and fireworks remains the same as it has been for several years, a total of nine. The addresses of these factories and descriptions of their products may be found listed in Appendix "A."

Inspectors of the Division made 41 visits of inspection to factories during the year, and in no case was there found any cause for serious criticism of the management. Owing to the steadily increasing demand for explosives, which was manifest throughout the year, several manufacturers found it necessary to make certain additions to the factory facilities and appropriation of buildings. The plans to bring about these increases were thoroughly examined by officers of the Division, who discussed them with the management of the explosives companies, so as to ensure that no added risk would be involved in the processes of manufacture. The Safety Committees, which have been functioning in the larger factories for a number of years, are still very active, and keep a close supervision of all details of manufacture and equipment in the plants. This is most helpful,

as the continuous and intimate association of the members with the work permits a scrutiny of the most minute details, and is at times productive of interesting and valuable suggestions not only for the promotion of safety but for the general improvement of products and processes. That the work of the Committees is fruitful in result is well shown by figures quoted from the report of three large factories for the past six years. This lists a total of 1,338 suggestions received during that period, all directed towards the promotion of safety. Of these 915 were accepted and put into effect.

The amount of high explosives, black blasting powders, ammunition, and fireworks produced in Canadian factories during the year 1937 is shown under their various classes in Appendix B. The total aggregates approximately 35,000 tons, which is an increase of 25 per cent over last year's record production. It is worthy of note that this year's output is slightly more than double that for the year 1932, reflecting the greatly increased activity in mining and construction work since the days of depression.

ACCIDENTS IN MANUFACTURE

There were no accidents in manufacture during the year resulting in loss of life or injury to persons.

At Beloeil on October 20 at 12.15 a.m. an explosion occurred in the small drowning tank in the No. 2 Nitrator House, destroying the building and its contents. The damage resulting from the explosion was confined to the area within the barricades, which themselves escaped injury and prevented to a large extent the projection of debris.

The regular daily shut-down procedure had been followed on the evening of October 19 and completed by nine o'clock, when the building was vacated. This routine consists of hosing out the interior of the nitrator and allowing the water to run off into the separator as long as this contains a charge. When the separator is emptied an aluminium pot is placed under the open nitrator outlet cock, and a small stream of water is left running through the pot and into the large drowning tank overnight. The separator is washed and left empty, and the prewash tank is flushed with water, drained into the small drowning tank and refilled with fresh water. The small drowning tank is left filled with water, and air agitation is kept up through a hard rubber pipe extending to the bottom of the tank at the outlet. Fresh water is supplied in a constant stream sufficient to replace all the water in the tank every two hours.

Any residue or "slum" resulting from the previous operations is left in the small drowning tank overnight, subject as above noted to air agitation and constant renewal of fresh water. Because of some slight impurity in the glycerine at that time in use, an impurity so small that it did not show up in the regular chemical tests to which the glycerine is subject on purchase, an abnormally large amount of slum had been produced in nitration. This slum appears in the separator as a nitroglycerine-waste acid emulsion between the waste acid and the nitroglycerine, and in the neutralizer it shows as a layer of neutral nitroglycerine-water emulsion between the nitroglycerine and the water. If allowed to stand the nitroglycerine will gradually separate out from the emulsion.

It is thought that some small amounts of waste acid may have been occluded in the slum and that this may have caused decomposition to set in and that the presence of the slum may have prevented the access of fresh water which would have carried off the heat evolved and prevented the spread of the decomposition. The experience derived from this event is valuable in that it shows the necessity of supplementing the ordinary tests to which glycerine is subject before purchase, and now samples from all shipments are nitrated in the laboratory and must show a minimum formation of slum as a condition to acceptance.

MAGAZINES

There were in effect at the end of the year 347 permanent magazine licences, a decrease of 21 from last year's number. This decrease does not represent any diminution in the demand for explosives, but is accounted for by the consolidation of two large firms each of which maintained a number of licensed magazines. In many places where both firms had kept stocks of explosives only one licensed magazine has been retained in use.

Temporary licences were issued to the number of 257, an increase of 33 over the past year, and of 50 over the average of the past ten years.

In the summer of 1937 a number of large logging and allied operations were reopened after a shut-down of several years, and while these plants were being put into order it was found in two cases that considerable stocks of explosives stored at inaccessible places had, with the lapse of time, become unsuitable for use, and were, after inspection, destroyed. In twenty licensed magazines small amounts of explosives were found in a deteriorated condition by inspectors of the Division, and a number of recoveries of stolen explosives were also made by the police, and all these were destroyed. The total amount of explosives in a dangerously deteriorated condition so destroyed amounted to 1,876 pounds of high explosives, 2,435 pounds of blasting powder and propellants, 497 detonators, and a small quantity of safety fuse.

Visits of inspection to 420 magazines were made by inspectors of the Division, and 293 by deputy inspectors of the Royal Canadian Mounted Police.

One magazine containing six cases of Blastol, a powerful high explosive, was consumed in a bush fire with its contents, without explosion. A man broke into a quarry magazine containing black blasting powder and dynamite. It is believed that he carried a light which caused the explosion of a keg of black powder, killing him. It is interesting to note that the explosion was not communicated to the rest of the stock in the magazine. Four men were injured at a mine by the explosion of a detonator magazine caused by the impact of a stray rifle bullet, and at another mine a storage of 4,000 detonators was destroyed in a similar manner, but without injury to anyone. In these cases one attributes the explosion to "stray" rifle bullets, but there is ever the possibility that they may have been caused by malicious intent.

THEFTS OF EXPLOSIVES

Eight licensed magazines were forcibly entered and small amounts of explosives stolen, and six cases are recorded of breaking and entering stores and unlicensed premises. On two occasions dynamite was pilfered from sleighs transporting dynamite to mines in the northern area. The total amount involved in these thefts was 800 pounds of explosives, 350 detonators, besides some ammunition and fuse, of which less than half was taken from premises licensed under the Explosives Act.

Explosives may be stolen with the object of profiting by their sale or use, or for employment in future criminal activity such as safe blowing or in committing an outrage.

Two youths stole some explosive from a coal miner and exploded it in proximity to a house at midnight with the intention of intimidating the inmate. They were sentenced to terms of detention in a house of correction.

There is a practical limit to the security which can be offered by a magazine, and the strongest may be as liable to attack as smaller ones, for the greater isolation of the larger magazine may offer a better chance for the criminal to work at it unobserved.

EXPLOSIVES FOUND

It is not an uncommon occurrence for large supplies of explosives to be stored in some temporary shelter by mining or exploring parties in remote and unsettled parts of the country when work is stopped for the season. It may be the intention to resume work the following season, but too often circumstances arise to prevent this, and the explosives are left unattended, to deteriorate gradually and become a menace to the safety of the chance visitor to the cache. There is a responsibility attached to operators under these circumstances, and it should be realized that it is better to destroy some expensive explosive than to leave it where it may become a serious danger to the public.

The usual number of small discoveries of abandoned explosives was made this year. People leave dynamite and detonators in dwelling houses, where they are found by incoming tenants, and criminals frequently hide explosives where they are subsequently found by children at play. In all 305 pounds of explosives, 264 detonators, and some fuse were found in twenty different caches.

Cases containing 75 pounds of solidified nitroglycerine were found in an open shack where they had been abandoned by a well-drilling outfit. Garbage collectors found dynamite in a box of refuse in a city. A strange case was when a workman in a gravel pit drove his pick into a buried case of dynamite which was dated 1910. Although 27 years old this dynamite functioned perfectly and was destroyed by exploding it in the usual manner. A prisoner told authorities the location of his cache consisting of a detonator and 3 ounces of nitroglycerine, and a similar supply was found by police when searching a house for stolen goods.

UNLICENSED PREMISES

Visits of inspection were made to 713 unlicensed premises by inspectors of the Division, and over 2,400 inspections were carried out by deputy inspectors of the Royal Canadian Mounted Police. In general it was found that the regulations were being well observed, and only on very rare occasions has it been found necessary to resort to legal action to enforce compliance. These inspections cover the storage of small amounts of explosives carried by merchants for retail sale, and include stocks of ammunition for pistols, rifles, and shotguns. Besides storing these stocks in reasonable security and in such a manner as not to endanger the public the vendor is required to keep records of all his sales of explosives, and of ammunition other than small .22 calibre rifle cartridges and shotgun shells.

One storekeeper was found with a 50-pound case of dynamite under his counter in proximity to a heating stove. He was instructed to move it, and a suitable place of storage was selected with his assistance. However a return visit a short time later disclosed the dynamite back in its former place under the counter, and the merchant was brought into court and fined. Such cases as this are rare, the value of the regulations is generally recognized, and good co-operation is given the law enforcement officers.

IMPORTS

The quantities of explosives imported under permit are shown, arranged according to their classes and descriptions, in Appendix "C." The number of permits issued was 482, and of special permits 37, a slight increase over the previous year. In the majority of items the variation in quantity was normal, but a great decrease is noted in the number of primers and detonators imported, owing to the greater manufacturing facilities now available in this country. Coronation festivities caused a lively demand for display fireworks and firecrackers that was met by an increase of approximately 200,000 pounds in the quantities imported. It is worthy of remark that the rejections of Chinese firecrackers has been reduced, through better understanding of the requirements by manufacturers, to a total of 1.25 per cent, a considerable reduction from previous years.

AUTHORIZATION OF EXPLOSIVES

Two new high explosives were authorized for manufacture and use, and one permitted explosive, Polar Monobel No. 14, Sheathed, was given provisional authorization. One new safety fuse and one detonating fuse were examined and authorized. In the course of factory inspections it is customary to take samples of the various classes of explosives being manufactured and to check them by chemical analysis against the authorized formulae, and in no case was any variation found that exceeded the allowed tolerance. In all 63 analyses were made of high explosives and 139 of various types of fireworks; 52 new fireworks were authorized for manufacture or sale in Canada.

In addition to the foregoing the Dominion Analyst of the Department of Pensions and National Health in Vancouver examined chemically 217 samples of imported fireworks, and of these all but two were found to comply with the conditions of the importation permits and were allowed entry.

PROSECUTIONS

Five cases were prosecuted under the Explosives Act, convictions were obtained and the offenders were punished by fines. A farmer left a tin of detonators in the hollow top of a fence post. Two boys passing by on a fishing expedition found the tin, and while one of them was investigating a detonator it exploded, severely mutilating the boy's hand. A contractor left some detonators in an unlocked shed where a boy found them, and while playing with one of the detonators he lost a thumb. Two merchants were convicted of storing explosives in a manner which endangered the public and were sentenced to pay fines and costs. A game warden in a northern district seized a quantity of explosives from a trapper on suspicion that it was intended to be used to blow up beaver dams. It transpired that the explosives, fuse, and detonators had been hidden in the man's blankets and carried to the trapping grounds in a public passenger plane. As the trapper had not notified the carrier of the dangerous nature of the goods he carried he was fined under Sec. 1, Order in Council 361.

There were a number of cases in which explosives were involved that were prosecuted under the Criminal Code. One, referred to elsewhere in this report, was where two youths stole a quantity of explosives and used it to commit an outrage, and were sentenced to terms of imprisonment. Two boys broke into a magazine and stole dynamite and detonators. They were apprehended and convicted, but were given suspended sentence.

ACCIDENTS

An increase in the number of accidents arising from the use of explosives is noted during the year, the total casualties numbering 38 killed and 210 injured, as against 31 and 177 in the corresponding categories in 1936. In view however of the greatly augmented production of explosives, amounting to nearly 25 per cent, this increase was to have been expected. There was a fatal accident for every 992 tons of explosives manufactured, and an injury for every 252 tons; the corresponding figures for the previous year being 962 and 209 tons respectively.

Of the 194 accidents that resulted in the casualties noted above, 45, or 24 per cent, were caused by playing with detonators and other explosives, and this "play" resulted in the death of three and the injury of 56, or 8 per cent of the total number of deaths and 27 per cent of the total injuries. Most children who come into possession of explosives do so because of the carelessness or indifference of those whose duty it is to safeguard these dangerous substances in such a way that they will be inaccessible to children. Unfortunately when there has been an accident it is frequently impossible to bring this responsibility home to individuals, but when definite proof exists the offender is prosecuted under the Explosives Act, and a conviction

under this Act does not debar the injured party from seeking redress and damages in the Civil Courts. In too many instances the person responsible may be a parent or near relative of the child, whose sightless eyes or mutilated members must ever be a constant reminder of the folly of carelessness and neglect to take proper precautions in disposing of unused explosives.

In ordinary use the greatest number of fatalities was caused by returning too soon to the shot hole. This type of accident may be caused by underestimating the time required for a fuse to burn, miscounting the shots in a round that have exploded, or by thinking a fuse had not been lighted when it had been so in fact. Other frequent causes of fatal accidents are not taking proper cover, projected debris, and drilling into unexploded charges.

In Appendix D will be found a detailed statement of the various accidents grouped under their probable causes, and in more detail those due to playing with detonators and other explosives.

A woman received, by mail, an attractively wrapped parcel. When she opened it there was an explosion. She received injuries and burns to hands, face and eyes. A miner was injured passing an unguarded chute when a charge exploded. Two men blasting a channel in a river prepared the charge and were approaching the hole where it was to be placed when the man carrying the charge slipped and fell. He was also carrying dry cells in his pocket and it is believed the lead wires from the electric detonators made contact with the battery. The dynamite exploded in his hand. He lost his left arm, while his companion received minor injuries. Lightning struck thirty sticks of dynamite and exploded them. Although debris was scattered in all directions there were no casualties among the road gang working nearby. Projected debris from a blast struck the handle of a valve of a donkey engine causing it to start a car which ran over a workman. A shot-firer working on mine road construction was instantly killed when a bundle of electric detonators exploded while he was handling them close to a blasting machine. A minor primed a stick of dynamite and laid it on the ground. He noticed a rock falling and went to remove the explosive. The rock struck the primed stick just as he grasped it, and his hand was blown off by the explosion.

APPENDIX A

Factories Licensed to Manufacture Explosives in 1937

Owner	Location of factory	General nature of product	Remarks
Canadian Industries, Ltd.....	Beloeil, Que.....	Blasting explosives, black powders, propellants.	
Canadian Industries, Ltd.....	James Island, B.C...	Blasting explosives, black powders.	
Canadian Industries, Ltd.....	Nobel, Ont.....	Blasting explosives.	
Canadian Industries, Ltd.....	Brainerd, Man.....	Blasting explosives.	
Canadian Industries, Ltd.....	Brownsburg, Que....	Ammunition, detonators, etc.	
Canadian Safety Fuse Co.....	Brownsburg, Que....	Safety fuse.	
T. W. Hand Fireworks Co., Ltd.	Dixie, Ont.....	Fireworks.	
B. Marroni.....	Ville St. Pierre, Que.	Fireworks.....	Operation intermittent.
Macdonald Metal Products Co., Ltd.	Waterloo, Que.....	Toy pistol caps.	
W. A. Lissaman.....	Islington, Ont.....	Fireworks.	

APPENDIX B

Production of Explosives in Canadian Factories during the Year 1937

	Quantity
Class I. Gunpowder.....	75,340 lb.
" II. Nitrate mixtures.....	1,484,225 "
" III. Nitro-compounds—	
Division 1.....	67,916,004 "
" VI. *Ammunition—	
Division 1—	
Safety cartridges.....	171,654,093 "
Safety fuse.....	Output of one factory.
Railway torpedoes.....	Output of one factory.
Percussion caps.....	Output of one factory.
Division 3—	
Detonators and electric detonators.....	Output of one factory.
" VII. Fireworks—	
Division 2—	
Commercial and display fireworks, fuse lighters, toy caps and railroad signals.	(approx. value) \$109,527.

*Exclusive of artillery ammunition but includes small arms ammunition made in Government factories.

APPENDIX C

Explosives Imported into Canada, January 1 to December 31, 1937

Class	Division	Description	Quantity
I		Gunpowder.....	513 lb.
II		Nitrate mixtures.....	3,843 "
III	1	Mixtures containing liquid nitro-compound.....	25,635 "
	2	Nitro-compounds:—	
		(a) Propellants.....	116,229 "
		(b) For use in explosives factories.....	374,947 "
		(c) For other manufacturing purposes.....	1,152,276 "
V	1	Fulminate of mercury.....	3,600 "
VI	1	Percussion caps.....	143,000 "
	2	Miners' squibs.....	340,000
		Detonating fuse.....	382,953 feet
	3	Detonators and electric detonators.....	3,200
		Fuses (whaling).....	500
VII	2	Manufactured fireworks.....	583,959 lb.
		Aeroplane starters.....	1,860

APPENDIX D Accidents from Explosives during the Calendar Year 1937

Circumstances or Cause	Mines and Quarries		Elsewhere		Total	
	Accidents	Number of Killed Injured	Accidents	Number of Killed Injured	Accidents	Number of Killed Injured
In Use—						
(a) Prematures, and failing to get away from the shot hole.	16	2 17	3	1 5	19	3 22
(b) Firing by electricity when persons are at the shot hole.	2	1 4	6	3 3	2	4 4
(c) Not taking proper cover.	8	1 7	5	4 1	14	5 10
(d) Projected debris.	10	1 11	9	4 5	15	5 12
(e) Hangfires, and returning too soon to shot hole.	16	5 17	2	1 2	25	9 22
(f) Tampering with misfired shots.	2	2 1	1	1 1	3	3 3
(g) Ramming or stemming the charge.	3	3 3	1	1 1	3	1 1
(h) Sparks, flame, etc.	1	1 1	1	1 1	2	2 2
(i) Boring into unexploded charge.	23	4 28	2	2 2	23	4 28
(j) Striking unexploded charge in removing debris.	2	2 2	2	2 2	2	2 2
(k) Preparing charges.	3	1 2	1	1 1	4	1 3
(l) Lighting fuse before inserting charge.	10	3 12	1	1 1	10	3 12
(m) Fumes.	11	2 11	5	1 6	16	1 17
(n) Springing or socketing shots.						
(p) Various.						
	107	22 115	34	13 28	141	35 143
In Manufacture.						
In Keeping.						
In Conveyance (other than by railway).						
				*		
Miscellaneous—						
(a) Playing with detonators.					29	1 33
(b) Playing with other explosives.					16	1 23
(c) Various.					8	1 11
				**	53	3 67
Totals, all circumstances.	107	22 115	34	13 28	194	38 210

*Except for these, accounts of which are given in the text, the accidents given in this table occurred in circumstances not directly controlled by the Act.

**Circumstances are given on next page.

APPENDIX D—Continued

Playing with Detonators

Cause of Accident	Killed	Injured
Boy, age 10, found a detonator on the street and thinking it was some form of firecracker, applied a light. It exploded. The first finger of his left hand was blown off while the thumb and middle finger were badly mangled. His right eye was also injured.....		1
Boy, age 10, found a detonator near his home. While playing with it it exploded. Two fingers of right hand were injured necessitating amputation.....		1
Boy found an electric blasting cap and took it to his teacher. Neither knew of its explosive properties and experimented with it, attaching the lead wires to a battery causing it to explode. Both received deep cuts to hands and face.....		2
Boy, age 13, found a detonator in his home and tried to remove the composition with a nail. He lost two fingers and thumb of his left hand by the explosion.....		1
Boy, age 12, was given a box marked "Flashlight Cartridges" by his teacher but it contained one detonator. When boy picked at it with a piece of wood it exploded, causing loss of his right eye and two fingers and thumb of left hand.....		1
Farmer shook a detonator box to find out if it contained enough for his job. There was an explosion. He was evidently so despondent at the loss of his right hand that he shot himself, dying of injuries.....	1	
Boy, age 11, found a detonator among some old fishing tackle left by a previous tenant. He picked out the composition with a pin causing it to explode. He lost two fingers and thumb of left hand.....		1
Boy, age 12, found box of detonators hidden in a hollow fence post "for safety" by a farmer. While playing with them one exploded. He lost two fingers and thumb of left hand.....		1
Boy, age 6, found detonator in his father's barn. He applied a light to it causing an explosion. He received injuries to his left hand which necessitated amputation of three fingers.....		1
Two small children found a detonator in their father's yard. They placed it on a board and struck it with a stone. There was an explosion. Each lost two fingers and thumb.....		2
Man helping to clean out an explosives magazine amused himself by fusing detonators, lighting the fuse and throwing them away before explosion. One detonator fired before he could get rid of it. He lost one finger of left hand and his right eye.....		1
Boy, age 12, found detonator with fuse attached left by outgoing tenant. He threw it on fire but when fuse ignited he picked it up to throw it out of doors. It exploded and he lost two fingers and thumb of right hand.....		1
Powderman to highway contractor took detonators home with him. While handling them one exploded. He lost his right eye and seriously injured his left.....		1
Man fused some detonators and fired them by igniting the short fuse. He thought the fuse had failed in one and went to pick it up when it exploded. He was severely cut by flying metal.....		1
Boy, age 11, found a detonator near his home. He applied a light to it, causing an explosion. He lost three fingers of his left hand.....		1
Boy, age 11, applied a match to a detonator and suffered severe injuries to his eyes and face by the explosion.....		1
Boy, age 15, took detonators from an open box left by contractor in an unlocked building. He fixed fuse to detonator and applied a match. Several had thus been fired successfully, but one, believed to have misfired, exploded when he returned to examine it. He lost thumb and two fingers of left hand.....		1
Boy, age 10, given a detonator by a schoolmate placed it under a can and used a piece of string as fuse and ignited it. He was badly peppered about the face and body by debris from the explosion which followed.....		1

APPENDIX D—Continued
Playing with Detonators—Continued

Cause of Accident	Killed	Injured
Boy found a detonator and tried to attach fuse to it while holding a lighted match in his hand. The detonator exploded. He lost three fingers of his left hand. The detonators were believed to have been left behind by a lumber company when their mill was dismantled.....		1
Two boys, aged 12 and 13, found a detonator in their father's barn. They placed it in a toy gun and applied a light. Both received injuries to their eyes and face.....		2
Boy, age 14, lost two fingers of left hand, suffered lacerations to face, arms and right hand by the explosion of a detonator with which he was playing.....		1
Boy, age 7, found a detonator among rubbish being cleared out of cellar left by previous tenant. While playing with it it exploded causing his hands to be severely injured.....		1
Two boys, aged 5, found a detonator in a barn. They placed it on a rock and struck it with a hammer. It exploded. Both received injuries to eyes, face, and arms.....		2
Boy, age 10, found a detonator left in woodshed by his father. He exploded it by applying a light. He lost two fingers and thumb of left hand....		1
Two boys, aged 13 and 14, entered unlocked shack used by construction company and took a box of detonators from shelf. While playing with them one exploded. Each boy lost two fingers and thumb of right hand.....		2
Boy, age 5, found a box of detonators placed on a beam at the mouth of a mine. He placed one on a slab and struck it with a rock. He received injuries to face, arms, and legs by the explosion.....		1
Boy, age 9, found detonators near his home. One exploded in his left hand causing injuries which necessitated amputation at wrist.....		1
Boy, age 10, found a detonator on his way to school. He applied a light to it. The tips of three fingers of his left hand were blown off by the explosion which followed.....		1
Man working in garage of a mine found a detonator and placed it on steam coil striking it with a hammer. It exploded. He lost his right eye, thumb and forefinger of left hand.....		1

APPENDIX D—Continued **Playing with other Explosives**

Cause of Accident	Killed	Injured
<i>Gunpowder—</i>		
Boy, age 12, found small bag containing gunpowder in barn. Not knowing its properties he applied a light to see if it would burn. He suffered severe injuries to hands and face.....		1
Youth, age 17, found can of gunpowder in public park. He applied a light to it causing it to flare up in his face. His eyes were severely injured.....		1
Boy, age 15, received severe facial burns when some gunpowder with which he was playing exploded.....		1
Four boys, aged 12 to 14, found a bag of powder and threw a lighted match into it. It exploded burning the boys about the face and hands.....		4
Boy, age 10, with companions stole some gunpowder from a mine magazine. While igniting a train of powder he got severely burned by the flash.....		1
<i>Small Arm Ammunition—</i>		
Youth, age 16, tried to extract a bullet from a .22 R.F. cartridge by means of a nail and hammer. The cartridge exploded injuring his left hand.....		1
Explosion of a "dud" .22 R.F. cartridge in the hands of a companion caused a 12 year old boy to be sent to hospital with a bullet in his abdomen.....		1
Two boys, aged 5 and 9, found a cartridge among some garbage. They tossed it into a bonfire. It exploded injuring both boys with the fragments of metal.....		2
Youth unloaded two shot shells with a view to making cigarette lighter. He used a drill and hot soldering iron without getting rid of the explosive. He received injuries to his left eye.....		1
<i>Flashlight Powder—</i>		
Four boys, aged 7 to 11, stole a bottle of photo-flashlight powder. The powder was placed in a glass bottle, laid on the ground and a train of powder prepared. The train was ignited causing the powder in the bottle to explode. The boys were injured by broken glass.....		4
<i>Fireworks—</i>		
Boy, age 13, found a "dud" rocket and ignited it. It exploded in his hand. He lost the tips of two fingers.....		1
Two youths, aged 17 and 19, were attempting to shoot some home-made fireworks in a home-made mortar. The mortar exploded. The younger man had his left hand blown off and serious injuries to his eyes, face, and legs. His companion escaped with lesser injuries.....		2
A firecracker thrown in the air landed in a boy's ear and exploded. His ear was injured necessitating an operation.....		1
Boy, age 9, was severely burned when firecrackers exploded in his pocket.....		1
Boy, age 16, mixed potassium chlorate, red phosphorus, and sulphur together and took it home with the intention of making a "bomb". While loading the bomb it exploded. He died from injuries.....	1	
Two men were applying an inflammable paint remover to a school wall. A girl exploded a firecracker near the wall. The paint remover ignited severely burning one of the workmen.....		1
Boys ignited firecrackers in show window with magnifying glass.....		
Two fires were caused by firecrackers.....		
Misdirected rocket smashed store window and ignited stock of fireworks.....		

APPENDIX D—Concluded**Miscellaneous**

Cause of Accident	Killed	Injured
Four men were working in a temporary mine office fifteen feet from a detonator magazine. It is believed a stray bullet from a hunter's rifle struck the magazine and exploded the detonators. All four men were injured.....		4
Man engaged in destroying damaged electric detonators when one exploded. He was severely injured by pieces of metal.....		1
Sun's rays ignited fireworks in store window. Two boys were injured trying to escape from the store.....		2
Man entered dynamite magazine. It is believed he in some way ignited the powder. He was killed by the explosion which followed.....	1	
A young tourist guide took a miniature bomb from a tourist's car. Thinking it was a flashlight he snapped the clip. It exploded mutilating his hand.....		1
Boy, age 13, was severely injured in the arm while sitting near a campfire. A companion had thrown a rifle cartridge which he thought was empty on to the fire which caused the explosion.....		1
Boy, age 16, lost an eye when he was struck by an exploding rocket during a fireworks display.....		1
Girl was burned about the face by burning debris during a fireworks display.....		1

APPENDIX E

Authorized Explosives

Explosives manufactured by Canadian firms as hereunder detailed:—

Canadian Industries, Ltd.

Polar dynamite—25, 30, 35, 40, 50, and 60 per cent.
 Polar Mineite—35, 40 per cent.
 Polar Ammonia Dynamite—20, 25, 30, 35, 40, 50, and 60 per cent.
 Polar Stopeite—20, 25, 30, 35, 40, 50, 55, and 60 per cent.
 Polar Gelatinized Dynamite—50, 60, and 75 per cent.
 Polar Forcite Gelatin—30, 35, 40, 50, 60, 75, 80, and 90 per cent.
 Giant Gelatin—20, 25, 30, 35, 40, 50, 60, 75, 80, and 90 per cent.
 Polar Monobels, 7 Sheathed.
 14 Sheathed (Prov. Au.)
 Polar Monobels, Nos. 4, 6, 7, and 14.
 Polar CXL-ite No. 2.
 Polar Cilgel.
 Polar Driftite.
 Gelatin Dough.
 C. X. L. Special Gelatin No. 1.
 C. X. L. Special Dynamite No. 1, No. 2, and No. 3.
 Polar Stumping No. 1, Extra, and Dominion Stumping No. 1.
 Blastol.
 S. N. G.
 Gypsumite "A," "B," and "C."
 Cordite.
 Black Blasting Powders.
 Black powder pellets.
 Gunpowder.
 Sporting powders.
 Safety fuse powders.
 Safety fuse lighters.
 Signal bombs.

Canadian Safety Fuse Co., Ltd.

Safety fuse—"Clover" brand.
 Safety fuse—"Black Clover" brand.
 Safety fuse—"Beaver" brand.
 Safety fuse—"White Jacket" brand.
 Safety fuse—"Crown" brand.
 Safety fuse—"Moose" brand.
 Safety fuse—"Pacific" brand.
 Fuse lighters.

Canadian Industries, Ltd. (Dominion Ammunition Divn.).

Ammunition.
 Detonators.
 Lead Azide.
 Lead Trinitroresorcinat.
 Percussion caps.
 Railway torpedoes.
 Electric detonators.
 Railway fusees.
 Tetrazene.

All explosives on the British authorized list are provisionally authorized in Canada, and in addition those manufactured by the following firms, as detailed below:—

American Powder Co., Maynard, Mass.

American, R.C. 22 short.

Atlas Powder Co., Wilmington, Del.

Electric blasting caps, Nos. 6, 7, and 8.

Blasting caps, Nos. 6, 7, and 8.

Nitrocellulose.

Trinitrotoluene.

Brücker and Zinke, Meissen, Germany.

Safety fuse—"Globe" brand.

Brücker and Zschetbsche, Minden, Germany.

Safety fuse—black fuse "Triumph" brand.

Safety fuse—white fuse "Triumph" brand.

California Cap Co., Oakland, Cal.

Detonators.

Central Railway Signal Co, Boston, Mass.

Railway torpedoes.

Railway fusees.

Dumore National Chemical Co., Seattle, Wash.

Regina Stumping powder Nos. 1 and 2.

Regina rock powder Nos. 1 and 2.

E. I. Dupont de Nemours & Company, Inc., Wilmington, Del.

Dupont bulk rifle powders (Nos. 80, 92).

Dupont smokeless shotgun powder.

Dupont pistol powders Nos. 5 and 6.

Dupont sporting rifle powders.

Ballistite smokeless shotgun powder.

Improved military rifle powders.

Dupont dense smokeless shotgun powder.

Fulminate of mercury.

Guncotton.

Trinitrotoluene.

Tetryl.

Dynamite and blasting gelatin.

Agritol.

Cordeau connector cap and clip.

Ensign Bickford Co., Simsbury, Conn.

Cordeau-Bickford fuse.

Pull wire fuse lighters.

Primacord.

Hercules Powder Co., Wilmington, Del.

Bullseye revolver powder.

Hercules smokeless rifle powder.

Hercules smokeless shotgun powder.

Infallible smokeless shotgun powder.

Dynamite and blasting gelatin.

Illinois Powder Manufacturing Co., St. Louis, Miss.

Ammonia dynamite—40 and 60 per cent.

Powdertol No. 1 and No. 3.

Independent Eastern Torpedo Co., Findlay, Ohio.

Nitroglycerine.

King Powder Co., King's Mills, Ohio.

Semi-smokeless powder.

Maison Farman, Billancourt, France.

Farman aero starting cartridge.

Poudreries Reunies, Brussels.
Safety fuse—"Shamrock" brand.

John R. Powell, Plymouth, Pa.
Miners' squibs.

Safety Mining Co., Chicago, Ill.
Cardox.

Trojan Powder Co., Allentown, Pa.
Trojan blasting CC.
Trojan TL 502.
Trojan 35 per cent standard.
Trojan 40 per cent standard.
Trojan 40C.
Trojan 50C.

United Railway Signal Corporation, Newton, Mass.
Railway torpedoes.

Western Cartridge Co., East Alton, Ill.
Detonators.

Authorized Explosives (Manufactured Fireworks)

Manufactured fireworks on the British authorized list are provisionally authorized in Canada.

All fireworks as manufactured by the following Canadian makers are authorized:—

Macdonald Metal Products Company, Ltd., Waterloo, Que.
Marroni, Berardo, St. Pierre, Que.
Toronto Fireworks Co., Ltd., Islington, Ont.
T. W. Hand Co., Ltd., and Dominion Fireworks Co., Dixie, Ont.
T. A. Lissaman, Islington, Ont.

Certain fireworks manufactured by the following foreign makers are authorized:—

Germany:

Blumberg and Co., Dusseldorf.
Eisfeld, J. F., Silberhutte, Anhalt.
Eckhardt, C. F. Nuernberg.
Fischer, Wilhelm, Worbis, Wurtemberg.
Geb. Weinrich, Worbis, Thuringen.
Gerka Werke, Offenbach on Main.
Hamburg-Bremer Handelgesellschaft, Hamburg.
Nicolaus H. and Co., Memingen, Thuringen.
Trummer and Co., Hamburg.
Wicks, Fred, Barmen.

Japan:

Hirono Shoten, Kobe.

United States:

Acme Pistol Cap Co., Columbus, O.
American Fireworks Co., Boston, Mass.
Antonelli Fireworks Co., Rochester, N.Y.
Backes, M. Sons Inc., Wallingford, Conn.
Burke and James Inc., Chicago.
Central Railway Signal Co., Boston, Mass.

United States—*Concluded*

Continental Fireworks Manufacturing Co., Dunbar, Pa.
 Coston Supply Co., New York.
 Edmiston Manufacturing Co., Columbus, Ohio.
 Edwards Co., Cincinnati.
 Essex Specialty Co., Berkeley Heights, N.J.
 Federal Buster Corporation, Pittsburgh.
 Hill, E. Vernon, Chicago, Ill.
 Hitt Fireworks Co. Inc., Seattle.
 Hubley Manufacturing Co., Lancaster, Pa.
 International Fireworks Co., New York.
 International Flare Signal Co., Tippecanoe City, Ohio.
 Jedel, A., Newark, Del.
 Kilgore Manufacturing Co. Inc., Westerville, Ohio.
 Los Angeles Fireworks Co., Los Angeles.
 Marshall, John C., Brooklyn, N.Y.
 National Fireworks Inc., West Hanover, Mass.
 New Jersey Flugent Co., New Brunswick, N.J.
 Norman Willets Photo Supply Co., Chicago.
 Potts Fireworks Display Co., Franklin Park, Ill.
 Rochester Fireworks Co., Rochester, N.Y.
 Safety Automatic Toy Co., Dayton, Ohio.
 Smith, Jas. H., Griffith, Ind.
 Standard Railway Fusee Corporation, Boonton, N.J.
 St. Louis Pistol & Caps, Inc., St. Louis, Mo.
 Triumph Fusee and Fireworks Co., Elkton, Md.
 Unexcelled Manufacturing Co., Inc., New York.
 Victory Fireworks and Specialty Co., Elkton, Md.

Small Chinese fireworks and Chinese firecrackers with gunpowder composition, and not exceeding four inches in length and nine-sixteenth inch in diameter, are authorized when found to function satisfactorily on examination at port of entry.

OTTAWA
J. O. PATENAUDE, I.S.O.
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1938

